

REMARKS

Applicant appreciates the Examiner's indication that Claims 15-20 contain allowable subject matter and requests continued prosecution of the Application. Claims 1, 2 and 4-21 remain pending. Applicants has amended Claims 1, 2, 11 and 21. In amending the Claims, Applicants do not intend to surrender any patentable subject matter. In addition to the foregoing amendments, this paper more particularly responds to the Office Action mailed March 13, 2003 as follows:

I. The Rejection of Claim 1, 2, 4-8, 11, 14 and 21 under 35 U.S.C. 103(a) over EP 0252606 in view of *Schultz et. al.* (US 2,365,220)

The Examiner rejected Claims 1, 2, 4-8, 11, 14 and 21 as being unpatentable over EP 0252606 in view of *Schultz et al.* Applicant respectfully traverses the Examiner's rejection.

Claims 1, 2, 4-8, 11, 14 and 21, as amended, recite "wherein the organic feedstock comprises nitrogen containing organic compounds of which at least a portion is oxidized in the liquid reaction medium, and wherein the second separated liquid is an aqueous solution containing at least a portion of the oxidized nitrogen-containing organic compounds." Additionally, Claim 4 recites "recovering at least a portion of the catalyst system from the separated second liquid and injecting all or a portion of the recovered catalyst system into the liquid reaction medium."

EP0252606 discloses a catalytic process for improving the cetane number of a hydrotreated diesel fuel containing aromatic and hydroaromatic compounds by selectively oxidizing, in the presence of a suitable catalyst, at least a portion of the benzylic carbon atoms present in the compounds.

Shultz et al. discloses a process for enhancing the combustion characteristics of diesel fuel by oxidizing a petroleum distillate in the presence of air or an oxygen-carrying gas and washing the oxidation product with a caustic soda solution to remove strongly acidic substances from the oxidation product.

The combination of EP0252606 in view of *Shultz et al.* does not teach or suggest "wherein the organic feedstock comprises nitrogen containing organic compounds of which at least a portion is oxidized in the liquid reaction medium, and wherein the second separated liquid is an aqueous solution containing at least a portion of the oxidized nitrogen-containing organic compounds" as recited in Claims 1, 2, 4-8, 11, 14 and 21. EP025260 specifically teaches that nitrogen is not

reduced in the oxidized product as compared to the starting material during practice of its process (See Example 1 in EP025260). This deficiency in EP025260 is not cured by Shultz *et al.*

Additionally, EP0252606 in view of Shultz *et al.* does not teach or suggest "recovering at least a portion of the catalyst system from the separated second liquid; and injecting all or a portion of the recovered catalyst system into the liquid reaction medium" as recited in Claim 4. The Examiner asserts that it would have been obvious in the art at the time the invention was made to have modified the process of EP0252606 reference by recycling the catalyst because the economics of the process will be improved. However, the Examiner has not cited a prior art reference to support this assertion. Absent a cited reference, Applicants submit that a *prima facie* case of obviousness against Claim 4 has not been established.

In light of the foregoing, EP0252606 in view of Shultz *et al.* is insufficient to establish a *prima facie* case of obviousness. As such, Applicant respectfully requests the Examiner to withdraw the rejection of Claims 1, 2, 4-8, 11, 14 and 21 under 35 U.S.C. 103 over EP 0252606 in view of Schultz *et al.*

II. The Rejection of Claims 9 and 10 under 35 U.S.C. 103(a) over EP 0252606 in view of Lyons *et al.* (US 4,375,361)

The Examiner rejected Claims 9 and 10 as being unpatentable over EP 0252606 in view of Lyons *et al.* Applicant respectfully traverses the Examiner's rejection.

In addition to the elements recited in Claim 1, Claims 9 recites the use of a catalyst selected from the group consisting of compounds represented by formula $M[RCOCH=C(O)R']_x$, and Claim 10 recites the use of a catalyst selected from the group consisting of compounds represented by formula $Mn[RCOCH=C(O)R']_2$, $Co[RCOCH=C(O)R']_2$ and/or $Ce[RCOCH=C(O)R']_3$.

Lyons *et al.* discloses a process for converting Udex raffinate to a high octane fuel (e.g. gasoline) component by mild, liquid phase oxidation to a product of moderate to low acidity, distilling off a neutral oxidate, esterifying the acidic residue to a neutral product and combining the neutral oxidate and the esterified portion. Lyons *et al.* discloses the use of acetylacetonates as an oxidation catalyst.

The combination of EP0252606 in view of Lyons *et al.* does not teach or suggest "wherein the organic feedstock comprises nitrogen containing organic compounds of which at least a portion is oxidized in the liquid reaction medium, and wherein the second separated liquid is an aqueous solution containing at least a portion of the oxidized nitrogen-containing organic compounds" as

recited in Claims 9 and 10. *EP025260* specifically teaches that nitrogen is not reduced in the oxidized product as compared to the starting material during practice of its process (*See Example 1 in EP025260*). This deficiency in *EP025260* is not cured by *Lyons et al.*

Additionally, there is lack of motivation or suggestion to combine *EP0252606* in view of *Lyons et al.*, nor is there a reasonable expectation of success in doing so. First, *EP0252606* and *Lyons et al.* target different petroleum products, namely diesel (*EP0252606*) and gasoline (*Lyons et al.*). Second, *EP0252606* and *Lyons et al.* enhances different combustion characteristics of the different products, namely cetane (*EP0252606*) and octane (*Lyons et al.*). Finally, *EP0252606* and *Lyons et al.* process different feedstreams, namely middle distillates (*EP0252606*) and Udex raffinates (*Lyons et al.*). Saying this, there is no suggestion or motivation to combine such divergent references. Even if there is a suggestion or motivation to combine *EP0252606* in view of *Lyons et al.*, there is no reasonable expectation that a catalyst utilized to enhance the octane of gasoline through oxidation of a raffinate would be successful in enhancing the cetane of diesel fuel through oxidation of a middle distillate.

In light of the foregoing, *EP0252606* in view of *Lyons et al.* is insufficient to establish a *prima facie* case of obviousness. As such, Applicants respectfully requests the Examiner to withdraw the rejection of Claims 9 and 10 under 35.U.S.C. 103 over *EP 0252606* in view of *Lyons et al.*

III. The Rejection of Claim 12 and 13 under 35 U.S.C. 103(a) over *EP 0252606* in view of *Schultz et al.* (US 2,365,220), and further in view of *Farka et al.* (US 2,472,152)

The Examiner rejected Claims 12 and 13 as being unpatentable over *EP 0252606* in view of *Schultz et al.*, and in further view of *Farka et al.* Applicants respectfully traverses the Examiner's rejection.

Claims 12 and 13 recite, through dependency, "wherein the organic feedstock comprises nitrogen containing organic compounds of which at least a portion is oxidized in the liquid reaction medium, and wherein the second separated liquid is aqueous solution containing at least a portion of the oxidized nitrogen-containing organic compounds."

The combination of *EP0252606* in view of *Shultz et al.*, and further in view of *Farka et al.* does not teach or suggest "wherein the organic feedstock comprises nitrogen containing organic compounds of which at least a portion is oxidized in the liquid reaction medium, and wherein the second separated liquid is aqueous solution containing at least a portion of the oxidized nitrogen-containing organic compounds" as recited in Claims 12 and 13. *EP025260* specifically teaches that

nitrogen is not reduced in the oxidized product as compared to the starting material during practice of its process (*See Example 1 in EP025260*). This deficiency in *EP025260* is not cured by *Shultz et al.* or *Farka et al.*

As a result, *EP0252606* in view of *Shultz et al.*, and in further view of *Farka et al.* is insufficient to establish a *prima facie* case of obviousness. As such, Applicants respectfully requests the Examiner to withdraw the rejection of Claims 12 and 13 under 35.U.S.C. 103 over *EP 0252606* in view of *Shultz et al.*, and in further view of *Farka et al.*

IV. Final Remarks

Marked-up versions of the abstract and Claims 1, 2, 11, and 21 the bracket and underlining method is attached to this document to show the changes made by the foregoing amendments. Applicant submits that this document is fully responsive to the Office Action mailed March 13, 2003 and that Claims 1, 2 and 4-21 are in condition for allowance. If the Examiner has any question regarding this paper, the Examiner is encouraged to contact Applicant's attorney at the Examiner's convenience.

The Commissioner for Patents is authorized to withdraw any additional fees required in connection with this Amendment and Response from Deposit Account No. 01-0528.

Respectfully submitted,



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VERSIONS WITH MARKINGS TO SHOW CHANGES MADE

I. Claims

1. A process for the production of refinery transportation fuel or blending components for refinery transportation fuel, which process comprises:

providing organic feedstock comprising a mixture of organic compounds derived from natural petroleum, the mixture having a gravity ranging from 10° API to about 100° API;

contacting a gaseous source of dioxygen with the organic feedstock in a liquid reaction medium containing a soluble catalyst system comprising at least one multi-valent and/or heavy metal while maintaining the liquid reaction medium substantially free of halogen and/or halogen-containing compounds, to form a mixture of immiscible phases comprising hydrocarbons, oxygenated organic compounds, water of reaction, and acidic co-products;

separating from the mixture of immiscible phases at least a first organic liquid of low density comprising hydrocarbons, oxygenated organic compounds and acidic co-products, and second liquid of high density which contains at least portions of the catalyst metal, water of reaction and acidic co-products;

wherein the organic feedstock comprises nitrogen containing organic compounds of which at least a portion is oxidized in the liquid reaction medium, and wherein the second separated liquid is an aqueous solution containing at least a portion of the oxidized nitrogen-containing organic compounds.

2. The process according to Claim 1, wherein the organic feedstock comprises sulfur-containing [and/or nitrogen containing] organic compounds one or more of which are oxidized in the liquid reaction medium, and wherein the second separated liquid is an aqueous solution containing at least a portion of the oxidized sulfur-containing [and/or nitrogen-containing] organic compounds.

11. A process for the production of refinery transportation fuel or blending components for refinery transportation fuel, which process comprises:

partitioning by distillation an organic feedstock comprising a mixture of organic compounds derived from natural petroleum, the mixture having a gravity ranging from about 10° API to about 100° API to provide at least one low-boiling organic part consisting of a sulfur-lean, mono-aromatic-rich fraction, and a high-boiling organic part consisting of a sulfur-rich, mono-aromatic-lean fraction;

contacting a gaseous source of dioxygen with at least a portion of the low-boiling organic part in the liquid reaction medium containing a soluble catalyst system comprising a source of at least one catalyst metal selected from the group consisting of manganese, cobalt, nickel, chromium,

vanadium, molybdenum, tungsten, tin, cerium, or mixture thereof, while maintaining the liquid reaction medium substantially free of halogen and/or halogen-containing compounds, to form a mixture of immiscible phases comprising hydrocarbons, oxygenated organic compounds, water of reaction, and acidic co-products;

separating from the mixture of immiscible phases at least a first organic liquid of low density comprising hydrocarbons, oxygenated organic compounds and acidic co-products, and second liquid of high density which contains at least portions of the catalyst metal, water of reaction and acidic co-products; and

contacting all or a portion of the separated organic liquid with a neutralizing agent thereby recovering a low-boiling oxygenated product having a low content of acidic co-products;

wherein the organic feedstock comprises nitrogen containing organic compounds of which at least a portion is oxidized in the liquid reaction medium, and wherein the second separated liquid is an aqueous solution containing at least a portion of the oxidized nitrogen-containing organic compounds.

21. The process according to Claim 11, wherein the organic feedstock comprises sulfur-containing [and/or nitrogen containing] organic compounds one or more of which are oxidized in the liquid reaction medium, and wherein the second separated liquid is an aqueous solution containing at least a portion of the oxidized sulfur-containing [and/or nitrogen-containing] organic compounds.